

AD-A158 106

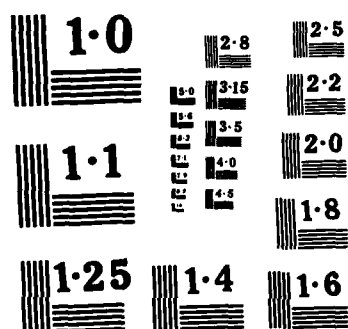
A PROGRAM FOR CLINICAL CARE IN PHYSICAL TRAUMA(U) PETER 1/1
BENT BRIGHAM HOSPITAL BOSTON MA F D MOORE MAR 76
DADA17-73-C-3022

UNCLASSIFIED

F/G 6/5

NL





NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

AD-A158 106

①

REPORT #1

"A Program for Clinical Care in Physical Trauma"

ANNUAL SUMMARY REPORT

Francis D. Moore, M.D.

MARCH 1976

Supported by

U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
Fort Detrick, Frederick, Maryland 21701-5012

Contract No. DADA 17-73-C-3022

Department of Surgery
of
Harvard Medical School
Peter Bent Brigham Hospital

DTIC
ELECTE
AUG 19 1985
S D
B

DOD DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited

The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents

DTIC FILE COPY

85 8 15 060

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A158 106	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) A Program for Clinical Care in Physical Trauma		5. TYPE OF REPORT & PERIOD COVERED Annual Feb. 1, 1975- Jan. 31, 1976
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Francis D. Moore, M.D.		8. CONTRACT OR GRANT NUMBER(s) DADA-17-73-C-3022
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of Surgery of the Harvard Medical School at the Peter Bent Brigham Hospital 721 Huntington Avenue, Boston, MA. 02115		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62772A.3S162772A814.00.051
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Medical Research & Development Command Fort Detrick, Frederick, MD 21701-5012		12. REPORT DATE March 1976
		13. NUMBER OF PAGES 5
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; "Distribution unlimited"		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Amino acids; ; Gluconeogenesis; Catheters; Glucose; Nitrogen Balance Vegetations; Glycerol; Ketones Heart Valves; Fat Emulsions; Free Fatty Acids Septic Endocarditis. Glucagon		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) / Studies were performed to determine substrate interactions as they relate to body nitrogen balance in fasting man. Carbohydrate at all levels of infusion markedly improves the utilization of amino acids. Thus, ketosis does not seem to favor nitrogen economy. Studies with indwelling cardiac catheters demonstrate vegetations on heart valves within 24 hours in dogs. These aseptic endocardial lesions easily become septic with intentional contamination of the blood stream in these animals.		

U.S. ARMY RESEARCH AND DEVELOPMENT COMMAND

CONTRACT NUMBER DADA-17-73-C-3022

"A PROGRAM FOR CLINICAL CARE IN PHYSICAL TRAUMA"

ANNUAL REPORT, JANUARY 31, 1976

During this 12 months period we have exploited extensively our standardized model for body fuel interactions in man. This consists in the employment of normal human volunteer subjects who are given fluids only by mouth for a period of 5-10 days. During this time they are given intravenously either pure substrates to examine substrate interaction, or a combination of hormones to reproduce the body fuel utilization patterns seen after injury.

The following categories have been essentially completed: amino acids alone, amino acids with low dose glucose, amino acids with high dose glucose, glycerol alone, glycerol with amino acids, and intravenous fat emulsions. In addition we have examined the effect of continuous or intermittent oral glucose, and the effects of catecholamines, cortisol and glucagon.

In this brief annual report no effort will be made to detail all the findings. They are being written up extensively at this time and all the manuscripts will be submitted to the Army Medical Research and Development Command, Surgical Office. Instead, we will undertake here a brief description of the data on amino acids alone.

Nitrogen intake daily was 13.5 grams, entirely by intravenous in the model mentioned above. Excretion daily after stabilization ranged from 17.5-21.1 grams per day. There was thus a wastage of nitrogen equal to the entire infusion plus some additional small contribution (4-7 grams) from endogenous sources. Assuming that total urea synthesis is a measure of gluconeogenesis it is possible to calculate the energetics of this fuel interaction: exogenous amino

acids substituting for glucose, and sparing body nitrogen. Positive nitrogen balance is not achieved with this program; the degree of nitrogen economy achieved with 90 grams of amino acids each day is approximately equivalent to that achieved with 500 grams of glucose alone. And yet the inter-conversion calculus suggests that this is achieved with a gluconeogenetic rate equivalent to only about 220 grams of glucose. The endocrine response is being analyzed in detail. Glucagon rises; blood glucose remains constant. The cost of this infusion of amino acids is approximately 5 times that of the equivalent amount of glucose. As mentioned in the foregoing, there is only a minor improvement in nitrogen economy.

Data on the plasma amino acids, and the changes induced in them by this infusion, are of the greatest interest. They show that the resting values for these normal male human subject volunteers who have been in good nutrition prior to the experiment, show levels somewhat higher than those reported in the literature. Citrulline, ornithine, and serine, three amino acids not present in the infusion material ("Freeamine II") or present at low concentrations, all fall. The other amino acids undergo appropriate changes with some startling exceptions.

It is evident from other studies that we have completed in the past year that carbohydrate markedly improves the utilization of amino acids at all levels and under all infusion circumstances. The infusion of this carbohydrate reduces the level of ketones to a mere zero; free fatty acids are markedly reduced. Serum triglycerides do not rise unless the glucose is given in excess. These data provide con-

vincing proof of the fact that in man neither ketone bodies specifically, nor ketosis as a whole, in any way favors nitrogen economy. The impression gained from the literature that ketosis is a favorable setting for protein synthesis or protein sparing is traceable to the fact that many of the experiments have been performed in rats which have a different economy for the utilization of ketone bodies. Or, alternatively, they have been performed in man by the infusion of ketone bodies in sufficiently large amounts so that the kidney oxidation has provided a source of carbohydrate energy.

Studies of this type will be continued and further explored in severely injured patients.

During the past six months the dog model employed to study the effect of cardiac catheterization and long indwelling monitor catheters in the cardiac chambers of pulmonary artery have been essentially brought to completion. These demonstrate that within 24-36 hours the animal shows sterile platelet vegetations on the heart valves. The intentional contamination of the blood stream of the animals even transiently (as in clinical burns) results in infection of these platelet thrombi on the heart valves and reproduces the septic endocarditis occasionally observed with long indwelling cardiac catheters in man. The clinical message is clear: in severely injured septic or burn patients it is very hazardous to employ indwelling cardiac catheters that traverse the heart valves. Even the central venous line must constantly be checked by withdrawal cultures to be sure it is not the source of blood stream infection.



By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

END

FILMED

9-85

DTIC